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Journal of Sport and Health Science 00 (2020) 1–4

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Opinion

Why have youth physical activity trends flatlined in the last decade? Opinion piece on "Global trends in insufficient physical activity among adolescents: a pooled analysis of 298 population-based surveys with 1.6 million participants" by Guthold et al.

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Received 22 April 2020; revised 24 April 2020; accepted 26 April 2020
Available online xxx

1. No global progress on youth physical activity prevalence

Despite hundreds of intervention studies over decennia that have been dedicated to developing and testing programs and strategies to promote physical activity (PA) in adolescents,[1–4] global inactivity levels remain persistently high. Based on self-report data from 1.6 million school-going adolescents from 146 countries, Guthold et al.[5] confirmed previous urgent calls to get adolescents more active. Researchers from the World Health Organization (WHO) recently published global prevalence rates and the first ever global time trends for insufficient PA in youth. They reported that more than 80% of school-going adolescents globally did not meet the current recommendations of at least 1 h of PA per day.

Based on existing WHO surveys and other multi-country surveys, for example the Global School based Student Health Survey and the Health Behaviour among School-aged Children, the prevalence of insufficient PA (MVPA) (defined as not engaging in 60 min of moderate-to-vigorous PA every day or reporting less than 60 min on 5 days/week) was derived for school-going adolescents aged 11–17 years (combined and by sex). Prevalence was reported separately for 146 individual countries, and was also presented by 4 World Bank income groups across 9 regions. For the trends data, prevalence had to be reported for at least 3 years within the 10- to 19-year age range over the years 2001 to 2016.

The findings are alarming and very consistent with the 2018 Global Matrix 3.0 Physical Activity Report Card.[6] The data appear to confirm that levels of insufficient activity among school-going adolescents continue to be extremely high, compromising their current and future health, with no meaningful progress being made for boys or girls. There are several issues to consider with these findings, which are further discussed: (1) assessment tools influence prevalence rates, (2) PA guidelines and domains, (3) girls continue to be less active than boys, (4) interventions to increase adolescent PA, and (5) the need for scale-up and systems approaches.

2. Assessment tools influence prevalence rates

It is generally acknowledged that the instrument used for assessing PA will greatly influence the prevalence rates. Guthold et al.[5] based their findings on available self-report data. Despite their known flaws, including potential social desirability bias and cross-cultural, age, or sex differences in reporting, the measures used have been previously validated against objective devices and shown to have acceptable accuracy and reliability at the group level.[7–9] While device-based data may provide more accurate prevalence estimates, using such tools for surveillance at a global level is currently still not feasible, especially for low-income countries that would not have the necessary resources. Furthermore compared to objective devices, self-report data are still better in capturing the different PA domains. Capturing accurate data across different PA domains is important for determining where potential changes in youth PA are occurring and the effectiveness of initiatives and programs at scale. It is therefore important to continue to strive for valid and reliable, harmonized, and detailed self-report data (e.g., The Youth Activity Profile self-report tool has been calibrated and cross-validated against accelerometry among youth in the United States).[10] However, it is also important to note that the trends reported by Guthold et al.[5] are based on using the same tool over time, and it is unlikely that different tools will result in substantially lower prevalence rates of insufficient PA.

Peer review under responsibility of Shanghai University of Sport.
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https://doi.org/10.1016/j.jshs.2020.04.009

Please cite this article as: Greet Cardon, Jo Salmon, Why have youth physical activity trends flatlined in the last decade? Opinion piece on "Global trends in insufficient physical activity among adolescents: a pooled analysis of 298 population-based surveys with 1.6 million participants" by Guthold et al., Journal of Sport and Health Science (2020), https://doi.org/10.1016/j.jshs.2020.04.009

3. PA guidelines and domains

Parrish et al.[11] recently revealed considerable variability between national/international PA guideline recommendations and pointed out that even small variations in wording could result in different interpretations (e.g., some countries indicated vigorous PA should be incorporated 3 days per week, while others say at least 3 times per week). As noted, Guthold et al.[5] defined insufficient PA as youth not engaging in 60 min of MVPA every day or reporting less than 60 min on 5 days per week. The current WHO PA guidelines for children and adolescents recommend engagement in at least 1 h of PA every day,[12] but there is also some variability in the interpretation of this guideline, especially in studies that use accelerometers. The latter tend to adopt an "average day" approach, with guidelines compliance based on participants who engage in at least 60 min of PA on 4 or more days per week.[13] This approach generally results in much lower prevalence rates of insufficient PA. Furthermore it needs to be noted that guidelines requiring an average engagement of 60 min/day across the week, which seems to be best supported by the evidence, may lead to difficulties to capture in population surveys. It is important that population prevalence estimates are based on consistent interpretations of measurable guidelines whenever possible.

Furthermore, although Guthold et al.[5] only reported on participation in MVPA, most PA guidelines for youth also hold recommendations for muscle and bone strengthening.[11] The WHO recommendations state that vigorous-intensity activities should be incorporated, "including those that strengthen muscle and bone, at least 3 times per week".[12] Incorporating muscle and bone strengthening into surveillance is challenging but of importance as currently little is known about the global prevalence of meeting these recommendations and this lack of surveillance and reporting may lead to decreased attention for these important components of health-related recommendations.

Although current PA guidelines do not include activity domains,[11] the PA paradox in adults points out that leisure-time PA has larger health benefits compared to occupational PA.[14] Furthermore Teychenne et al.[15] argue that current adult PA guidelines may not effectively address mental health outcomes and that leisure and transport related PA are most likely to confer mental health benefits. Therefore, Teychenne et al.[15] advise the promotion of enjoyable PA, preferably during leisure time. Although this evidence is based on adult datasets, translation toward guidelines for adolescents seems plausible. The WHO recommendation states that for children and young people "physical activity includes play, games, sports, transportation, recreation, physical education, or planned exercise, in the context of family, school and community activities".[12] The current report does not, however, take domains or contexts into account. Furthermore, Guthold et al.[5] only included school-going adolescents in their pooled analysis. This factor may indeed explain why, in contrast with some previous findings, in general the prevalence of insufficient PA was found to be higher in low-income countries (85%) than in high-income countries (79%). Previous reports of higher levels of PA in low-income countries compared to high-income countries could be primarily related to higher engagement in PA outside physical education, sports and active recreation, such as active domestic chores or work-related PA. Highlighting adolescents' access to a variety of enjoyable types and domains of PA should be considered in future PA guidelines.

4. Girls continue to be less active than boys

In line with the available literature, girls were less active than boys in all but four (Tonga, Samoa, Afghanistan, and Zambia) of 146 countries in the Guthold's et al.[5] paper. The difference in the proportion of boys and girls meeting the recommendations was even greater than 10 percentage points in almost one in 3 countries in 2016. The gender gap is in line with many other studies and has been a point of attention for many years.[16] The widening of the gender gap in the large majority of countries (73%, 107 of 146 countries) is worrying. It is also remarkable that the widening gaps over time were particularly apparent in some high-income countries, such as Singapore, the United States, and Ireland. Clearly, more opportunities to meet the needs and interests of girls are needed to attract and sustain their participation in PA.

Guthold et al.[5] identified some national campaigns that effectively addressed the gender gap. Furthermore, they pointed out that the visibility and creation of more active female role models can positively influence girls' decisions and participation, and that social marketing campaigns combined with community-based interventions should be starting points to increase PA levels in girls. Additionally, girls should be more involved in efforts to create activity friendly environments in which the "healthy choice is the easy choice", which is vital for reaching large populations equitably. Neighborhood environmental interventions should foster safe independent mobility, which is found to be particularly important for girls.[17]

5. Interventions to increase adolescent PA

Clearly, with such persistent levels of insufficient PA over many years, intervention strategies to increase youth activity levels have been largely unsuccessful. A Realist methodology[18] might be a useful approach for better understanding the outcomes of programs and policies in the scope of PA promotion efforts for boys versus girls and for different socioeconomic groups. This methodology moves past the question of "Was it successful?" to better understand how, for whom, and under what circumstances interventions produce their particular outcomes. Guthold et al.[5] noted that "investment and leadership, as well as engagement of youth themselves, will be vital to strengthen the opportunities for physical activity in all communities". Indeed scientists, aiming at developing youth PA interventions should consider a pragmatic and participatory approach to intervention development and work much more closely and as equal partners with relevant stakeholders. This approach needs to be more systematic than the use of a

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loose collection of methods, tools, approaches, and practices that are collectively labelled as "participatory", but that do not have strong theoretical and methodological foundations. Elevating co-creation into a more rigorous and evidence-based methodology is therefore needed.[19]

6. The need for scale-up and systems approaches

Guthold et al.[5] express an urgent call for the scaling up of implementation of known effective policies and programs. Indeed, it is widely recognized that there is a huge gap between the development of evidence-based interventions for health promotion and their successful and sustainable implementation. Currently, implementation is a very slow process, with the average time lag between scientific discovery and action being 17 years.[20] Furthermore, only a small fraction of evidence-based interventions are actually implemented in practice and policy and, even when implemented, interventions rarely achieve sustainable effects or the predicted effects found under controlled conditions.[21]

Clearly, implementation science approaches need more attention in order to better promote the systematic uptake of evidence-based programs into routine practice, and, hence, to improve the quality and effectiveness of health promotion efforts.[22] Furthermore, few randomized controlled trials consider the system within which they are conducted. To have the most significant impact on PA at a population level, an understanding of the complex systems that these behaviors are embedded within is necessary.[23] The implementation and scale-up of effective evidence-based PA programs require identification of key stakeholders across multiple levels of the system, and identifying and working through key barriers to implementation.[22]

In sum, the findings of Guthold et al.[5] are alarming and we support their call for action. Consistent interpretations of guidelines, considering PA domains and the inclusion of data from adolescents no longer attending school are important for future surveillance. Using systematically developed realist and co-creation methodologies to better understand and develop multisectoral strategies and programs and efforts to promote effective uptake of evidence-based programs into routine practice at scale are urgently needed.

And on a final but also important note, while a healthy lifestyle including PA participation is of utmost importance to prevent noncommunicable diseases, the entire world, including millions of youngsters, have recently been confronted with safety measures like staying home, to avoid the spread of coronavirus disease-2019. As Chen et al.[24] and others[25] pointed out, prolonged home stays can increase behaviors that lead to inactivity and contribute to anxiety and depression, which in turn can lead to a sedentary lifestyle known to result in a range of chronic health conditions. Given the concerns about the increasing spread of the coronavirus and maybe other viruses in the future, efforts are needed to support maintaining regular PA and routinely exercising in a safe home environment and further study is needed to inform decision makers on benefits and harms of safety measures and on protecting the right to walk, run, and cycle outdoors safely for those who are not symptomatic.

Authors' contributions

Both authors have contributed significantly to this opinion piece. Both authors have read and approved the final version, of the manuscript and agree with the order of the presentation of the authors.

Competing interest

The authors declare that they have no competing interests.

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